

# **Tactical Combat Casualty Care**

**February 2010**



# **Introduction**



# Pre-Test





# **What is TCCC and Why Do I Need to Learn about it??**



- **Coalition forces presently have the best casualty treatment and evacuation system in history.**
- **TCCC is what will keep you alive long enough to benefit from it.**



# Statistics for Battle Casualties, 1941-2005

*Holcomb et al J Trauma*

2006

**the U.S. casualty survival rate in the GWOT is the best in our nation's history.**

	World War II	Vietnam	OIF/OEF
% CFR	19.1%	15.8%	9.4%

Note: CFR is the Case Fatality Rate – the percent of those wounded who die



# Why Are We Doing Better?

- **Improved Personal Protective Equipment**
- **Tactical Combat Casualty Care**
- **Faster evacuation time**
- **Better trained medics**

*Holcomb et al J Trauma 2006*



# TCCC

**“I am writing to offer my congratulations for the recent dramatic advances in prehospital trauma care delivered by the U.S. military. Multiple recent publications have shown that Tactical Combat Casualty Care is saving lives on the battlefield.”**

***Dr. Jeff Salomone***

***American College of Surgeons Committee on Trauma***

***Chairman of Prehospital Trauma Subcommittee***

***Letter to ASD Health Affairs***

***10 June 2008***



# **Mabry and McManus AMEDD Center and School**

**“The new concept of Tactical Combat Casualty Care has revolutionized the management of combat casualties in the prehospital tactical setting.”**

***Critical Care Medicine  
July 2008***



# U.S. Marine Corps Message 30 October 2009

- 5. EFFECTIVE IMMEDIATELY, THE RECENTLY APPROVED TCCC GUIDELINES WILL BECOME THE STANDARD TO WHICH TRAINING EFFORTS SHOULD BE FOCUSED AND EVALUATION WILL BE BASED.** THESE CHANGES WILL AFFECT NUMEROUS TRAINING PROGRAMS AND COURSES. EFFORTS ARE ALREADY UNDERWAY TO UPDATE STANDARDS AND WILL BE ACCOMPLISHED THROUGH THE NORMAL STAFFING PROCESS. **A KEY ELEMENT OF THE TCCC GUIDELINES IS THEIR APPLICABILITY TO MEDICAL PERSONNEL, COMBAT LIFESAVERS, AND INDIVIDUAL DEPLOYING COMBATANTS.**





# Objectives

- **EXPLAIN** the differences between military and civilian pre-hospital trauma care
- **DESCRIBE** the key factors influencing combat casualty care
- **UNDERSTAND** how TCCC developed
- **DESCRIBE** the phases of care in TCCC



# Importance of the First Responder

- **75-90% of all combat deaths occur before the casualty reaches a Medical Treatment Facility (MTF)**
- The fate of the injured often lies in the hands of the one who provides the first care to the casualty.
- Corpsman, medic, or pararescueman (PJ)
- Combat Lifesaver or non-medical combatant



# Civilian Trauma Care Setting



# Tactical Trauma Care Setting - Mrapnel Wound in the Hindu Kush





# **Prehospital Trauma Care: Military vs Civilian**

- **Hostile fire**
- **Darkness**
- **Environmental extremes**
- **Different wounding epidemiology**
- **Limited equipment**
- **Need for tactical maneuver**
- **Longs delays to hospital care**
- **Different medic training and experience**







# Prior Medical Training

- Combat medical training historically was modeled on civilian courses
  - EMT, PHTLS
  - BTLS, ATLS
- Trained to standard of care in non-tactical (civilian) settings
- Tactical elements not considered



# Different Trauma Requires Different Care Strategies

- Intuitive that these are different, BUT
- Difficult to devise and implement needed changes
- No one group of medical professionals has all of the skills and experiences necessary.
- Trauma docs and combat medical personnel have different skill sets. Both are needed to optimize battlefield trauma care strategies.
- Tourniquets are one striking example of how battlefield trauma care has sometimes been slow to change.



# **Tourniquets in WWII**

## **Wolff AMEDD J April 1945**

“We believe that the strap-and-buckle tourniquet in common use is ineffective in most instances under field conditions...it rarely controls bleeding no matter how tightly applied.”





# Vietnam

Over 2500 deaths occurred in Vietnam secondary to hemorrhage from extremity wounds. These casualties had no other injuries.





# **Tourniquets in U.S Military**

## **Mid-1990s**

- **Old strap-and-buckle tourniquets were still being issued.**
- **Medics and corpsmen were being trained in courses where they were taught **not** to use them.**



# **SOF Deaths in the GWOT**

## **Holcomb, et al**

### ***Annals of Surgery 2007***

#### **Factors That Might Have Changed Outcomes** **(82 Fatalities - 12 Potentially Survivable)**

- Hemostatic dressings/direct pressure (2)
- **Tourniquets (3)**
- Faster CASEVAC or IV hemorrhage control (7)
- Surgical airway vs intubation (1)
- Needle thoracostomy (1)
- PRBCs on helos (2)
- Battlefield antibiotics (





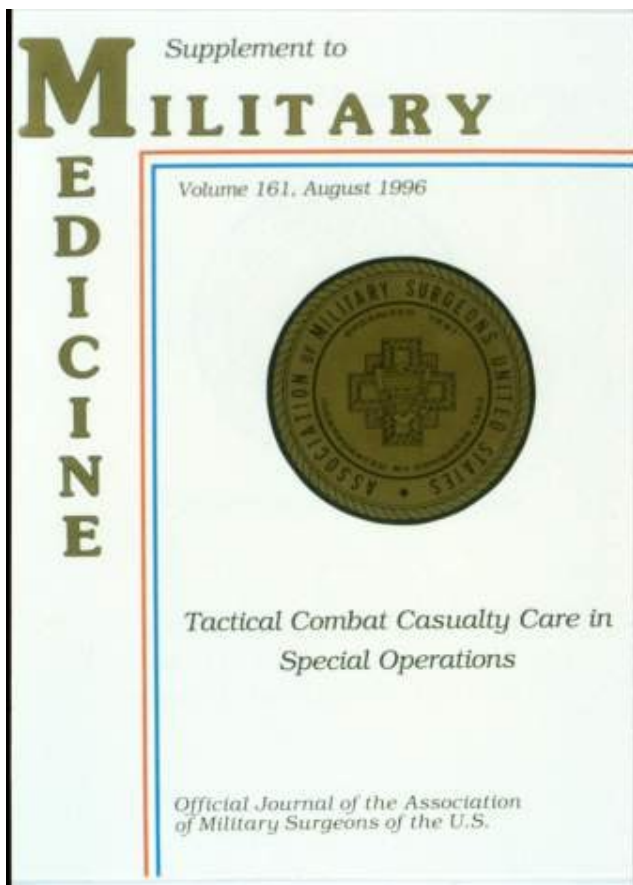
# Tourniquets - Beekley et al Journal of Trauma 2008

- 31<sup>st</sup> CSH in 2004
- 165 casualties with severe extremity trauma
- 67 with prehospital tourniquets; 98 without
- Seven deaths
- **Four of the seven deaths were potentially preventable with adequate prehospital tourniquets placed**





# Tactical Combat Casualty Care in Special Operations



## Military Medicine Supplement August 1996

***Trauma care guidelines customized for the battlefield***



# TCCC

- Originally a Special Operations research effort
- Trauma management plans that take into account the unique challenges faced by combat medical personnel
- Now used throughout U.S. military and by most allied countries
- TCCC has helped U.S. combat forces to achieve the highest casualty survival rate in history.



# TCCC Approach

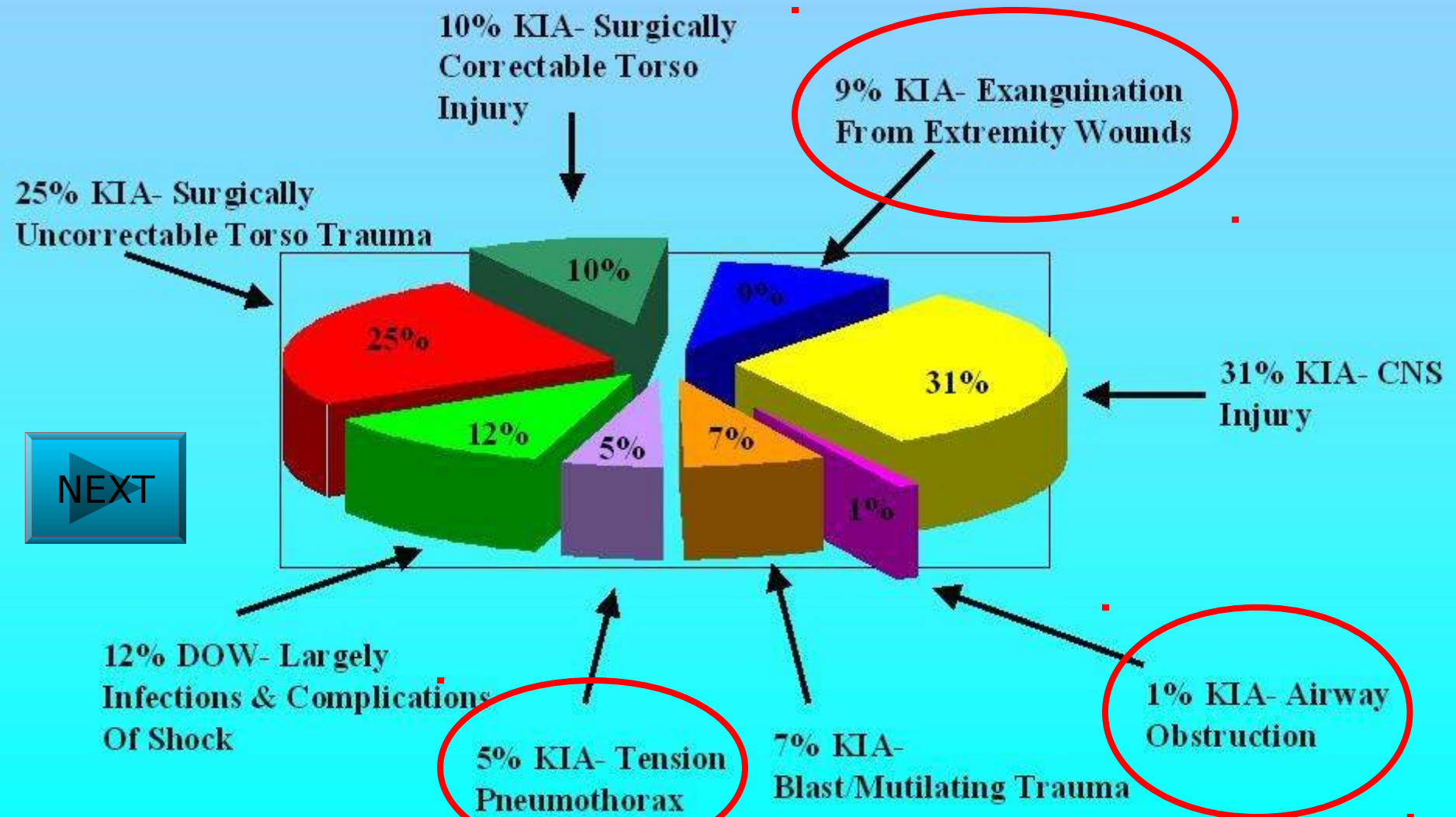
- **Identify the causes of preventable death on the battlefield**
- **Address them aggressively**
- **Combine good medicine with good tactics**





# How People Die In Ground Combat (From COL Ron Bellamy)

Data based on the Wound Data Munitions Effectiveness Team (WDMET) during the Vietnam War between 1967 and 19

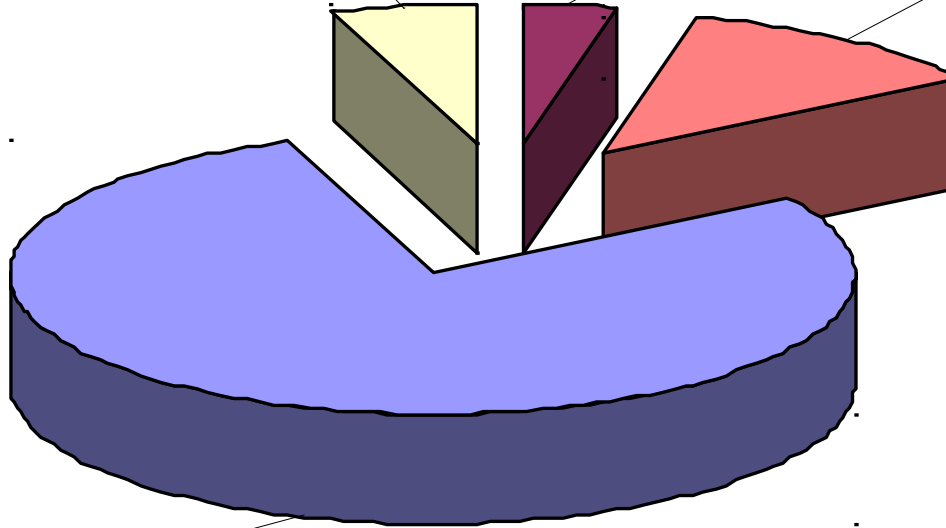






# Potentially Survivable Deaths (232) in OIF and OEF

CNS 9%      MSOF 4%      Airway 14%



**Hemorrhage**  
**85%**

**31% Compressible (prehospital target)**  
**69% Non-Compressible (FST/CSH target)**

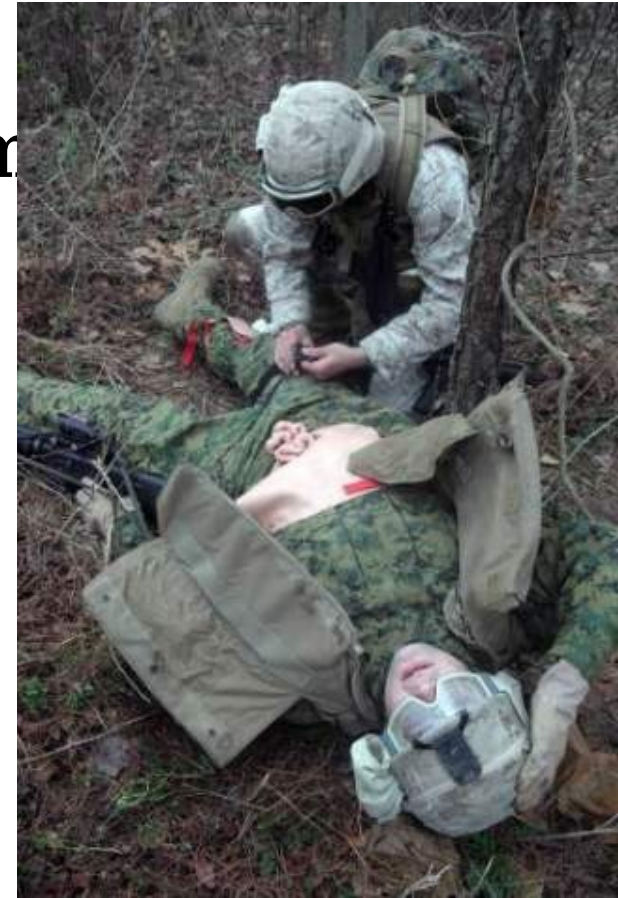
From evaluation of 982 casualties, and casualties could have more than 1 cause of death. (Kelly J., J Trauma 64:S21, 2008)



# Point of Wounding Care

**Three most common causes of preventable death on the battlefield**

- **Hemorrhage from extremity wounds**
- **Tension pneumothorax**
- **Airway problems**





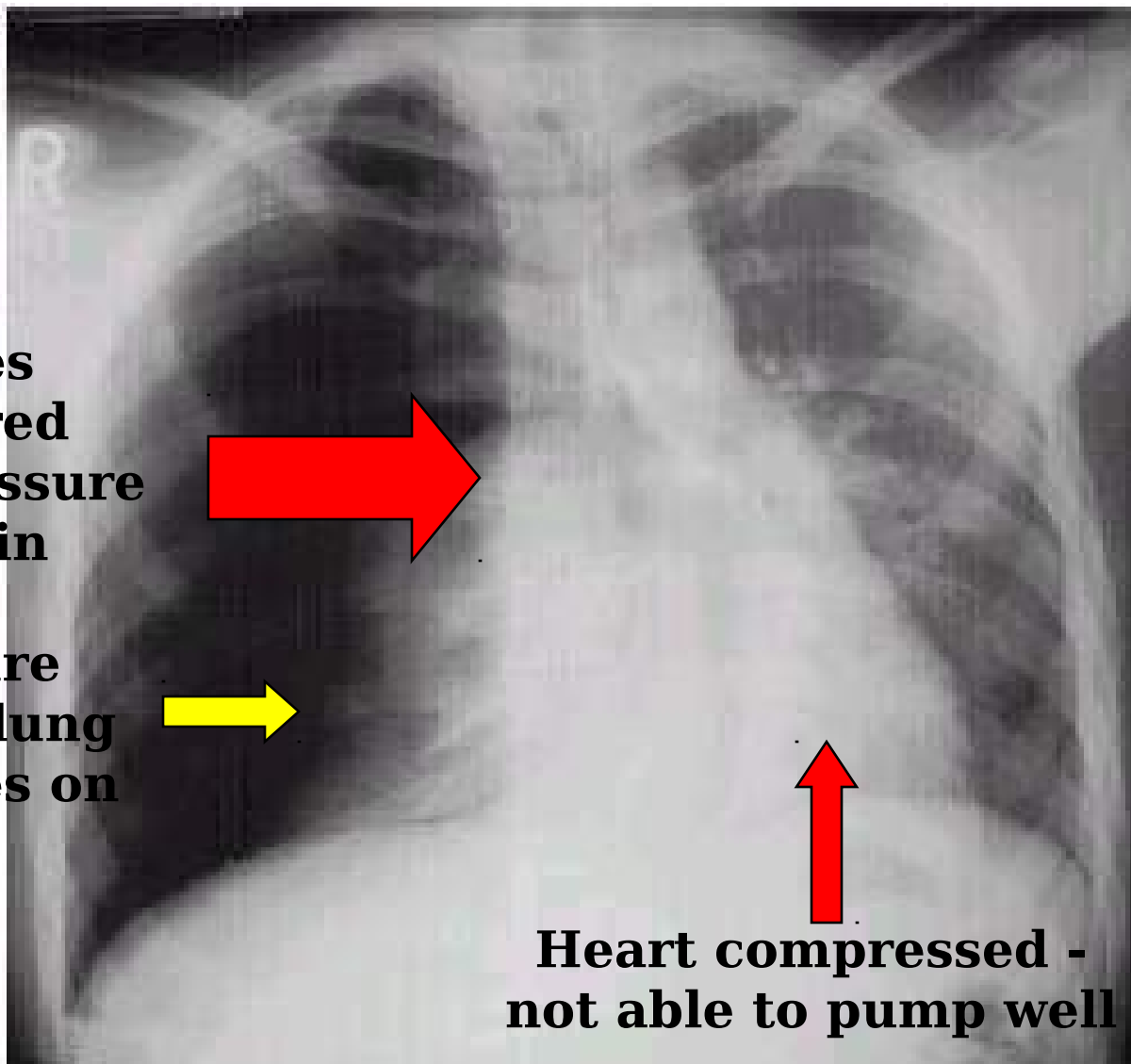
# Extremity Hemorrhage



**Click on picture to start video**



# Tension Pneumothorax



**Air escapes  
from injured  
lung - pressure  
builds up in  
chest**

**Air pressure  
collapses lung  
and pushes on  
heart**

**Heart compressed -  
not able to pump well**



# Airway Trauma







# Three Objectives of TCCC

- **Treat the casualty**
- **Prevent additional casualties**
- **Complete the mission**





# **TCCC Guidelines 1996**

- **Tourniquets**
- **Aggressive needle thoracostomy**
- **Nasopharyngeal airways**
- **Surgical airways for maxillofacial trauma**
- **Tactically appropriate fluid resuscitation**
- **Battlefield antibiotics**
- **Improved battlefield analgesia**
- **Combine good tactics and good medicine**
- **Scenario-based training**
- **Combat medic input to guidelines**



# **Changes in TCCC: How Are They Made?**



## **The Committee on Tactical Combat Casualty Care**





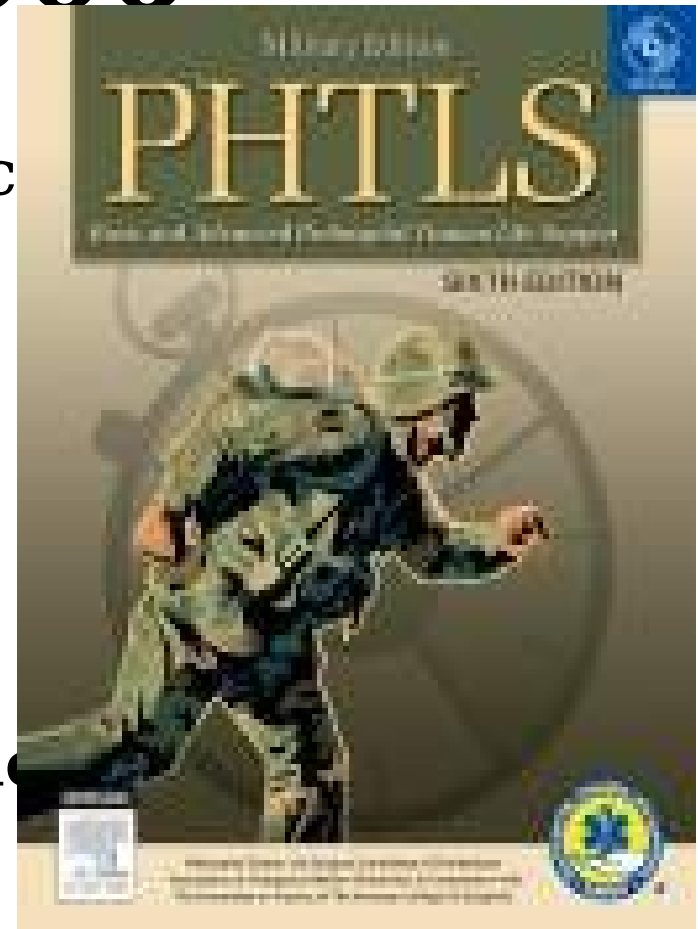
# Tactical Combat Casualty Care

- **Sponsored by the DoD**
- **42 members from all services in the DoD and civilian sector**
- **Trauma Surgeons, ER and Critical Care physicians, operational physicians; medical educators; combat medics, corpsmen, and PJs**
- **Nearly 100% deployed experience**
- **Meet quarterly; update TCCC as needed**
- **Part of Defense Health Board - senior medical advisory body to SECDEF**



# TCCC Updates 2003 and 2006

- **HemCon and QuikClot**
- **Intraosseous infusion device**
- **Combat Pill Pack**
- **Hypotensive resuscitation with Hextend**
- **Fentanyl lozenges**
- **Moxifloxacin**
- **Hypothermia prevention**
- **Management of wounded h combatants**



**\*Endorsed by ACS COT and NAEMT**



# Timing Is Everything

- Casualty scenarios in combat usually entail both a medical problem as well as a tactical problem.
- We want the best possible outcome for both the casualty and the mission.
- Good medicine can sometimes be bad tactics; bad tactics can get everyone killed or cause the mission to fail
- **Doing the RIGHT THING at the RIGHT TIME is critical**



# TCCC Phases of Care

- TCCC divides care into 3 phases based on the tactical situation.
- During the gunfight, attention is focused primarily on eliminating the threat.
- As the threat decreases, increasing focus is applied to providing the best possible medical care for the casualties.



# Phases of Care in TCCC

- **Care Under Fire**
- **Tactical Field Care**
- **Tactical Evacuation Care**





# Care Under Fire

Care under fire is the care rendered by the first responder or combatant at the scene of the injury while he and the casualty are still **under effective hostile fire**. Available medical equipment is limited to that carried by the individual or by the medical provider in his or her aid bag.



# Tactical Field Care

Tactical Field Care is the care rendered by the first responder or combatant once he and the casualty are **no longer under effective hostile fire**. It also applies to situations in which an injury has occurred, but there has been no hostile fire.

Available medical equipment is still limited to that carried into the field by unit personnel. Time to evacuation to a medical treatment facility may vary considerably.



# Tactical Evacuation Care

Tactical Evacuation Care is the care rendered once the casualty has been picked up by an aircraft, vehicle or boat. Additional medical personnel and equipment that may have been pre-staged should be available in this phase of casualty management.





# Summary of Key Points

- Prehospital trauma care in tactical settings is markedly different from civilian settings.
- Tactical and environmental factors have a profound impact on trauma care rendered on the battlefield.
- Good medicine can be bad tactics.
- Approximately 20% of combat deaths today are potentially preventable.
- Good first responder care is critical.
- **TCCC will give you the tools you need!**



# Summary of Key Points

- Three phases of care in TCCC
  - Care Under Fire
  - Tactical Field Care
  - TACEVAC Care



# Summary of Key Points

- **TCCC - designed for combat**
- **NOT designed for civilian trauma settings**





**Questions?**